

**Abstract of the Disclosure**

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A nickel/palladium/gold metallization stack is formed upon connection pads of integrated circuits at the wafer level through an electroless plating method. The metallization stack can be formed over copper or aluminum interconnect pads; the lower nickel layer bonds securely to the copper or aluminum interconnect pads, while the intermediate palladium layer serves as a diffusion barrier for preventing the nickel from out-diffusing during subsequent thermal cycles. The upper gold layer adheres to the palladium and readily receives a variety of interconnect elements, including gold bumps, gold wire bonds, solder bumps, and nickel bumps. The electroless plating process permits connection pads to be formed using fine geometries, and allows adjacent connection pads to be formed within 5 micrometers of each other.